# product user guide

mabey hire
part of the mabey family

| Title | Issue | Date |
|---|---|---|
| 7m Standard Pinned Strut Dragbox System | 5 | August 2012 |

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## 1. Introduction

This booklet is intended to provide basic information for users of the Mabey 7m Long Standard Pinned Strut Dragbox system and to draw the clients attention to the practical aspects of handling, assembly, installation and use which need to be considered in compiling a safe system of work. In particular, the clients attention is drawn to the size and weights of the Dragbox components and the need for planning the lifting operations involved.

The Dragbox is intended to act as a shield to provide a safe working area for operatives working in a trench. It is not intended to provide significant support to the trench sides, and is therefore intended for use only in dry stable ground which stands to the excavated depth. It can then be dragged along a pre-dug trench. Users should ensure that the length and selected width of the box is sufficient for the work to be carried out. Dragboxes are not normally suitable for use in water bearing soils or in trenches crossed by frequent services.

It is assumed that clients are familiar with general safe practices applicable to the use of Dragboxes.

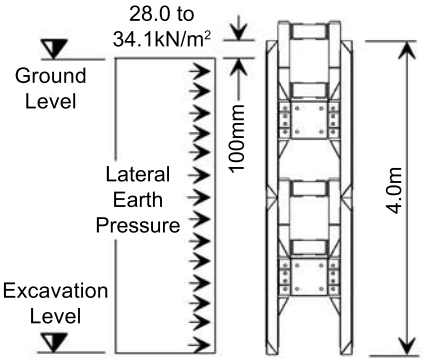
All major components of the Dragbox System have lifting points for safe slinging.

The Dragbox is not intended for any other purposes.

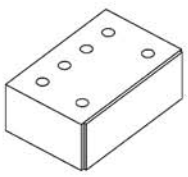
## 2. Design

In the event of trench wall instability the Dragbox is designed to carry a uniform lateral earth pressure of 28.0kN/m$^2$ when using hogback rear struts and 34.1kN/m$^2$ when using standard rear struts. Users are advised to check that their excavation arrangement will not impose greater working pressures than this. Conditions which will increase the likelihood of trench wall instability and lateral earth pressures are:

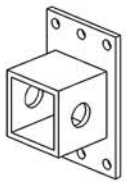
a) Close proximity of structures.
b) Excavated or construction materials adjacent to the trench.
c) Close proximity of site roads.
d) Close proximity of railways.



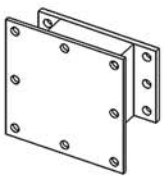

## 3. Identification of Components



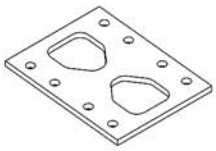
**Pinned Front Strut Inner**
Code: DPSF-INNER
Size: 458 x 300 x 174
Weight: 44.5 Kg



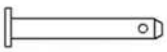
**Pinned Rear Strut Inner**
Code: DPSR-INNER
Size: 320 x 200 x 155
Weight: 13.2 Kg



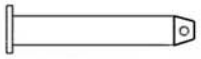
**Rear Strut Spacer**
Code: DSR-S
Size: 320 x 320 x 160
Weight: 27 Kg



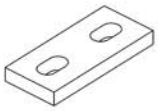
**Front Conn. Plate**
Code: DBX-FCP
Size: 370 x 280 x 20
Weight: 16 Kg



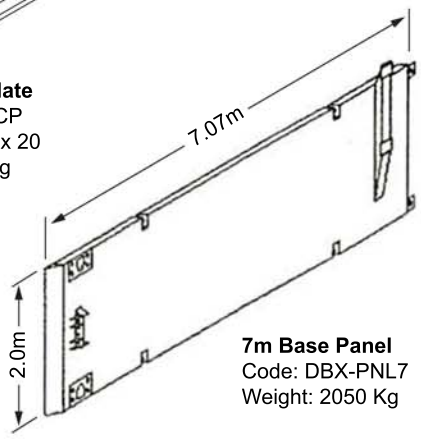
**Front Strut Pin**
Code: DPSF-PIN
Size: 35 dia x 245
Weight: 2.0 Kg



**Rear Strut Pin**
Code: DPSR-PIN
Size: 50 dia x 260
Weight: 3.9 Kg



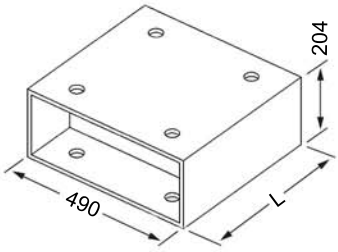
**Rear Conn. Strap**
Code: DBX-RCS
Size: 225 x 100 x 30
Weight: 5 Kg



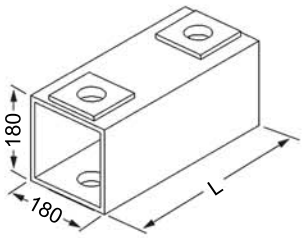

**7m Base Panel**
Code: DBX-PNL7
Weight: 2050 Kg

## 3. Identification of Components Cont'd

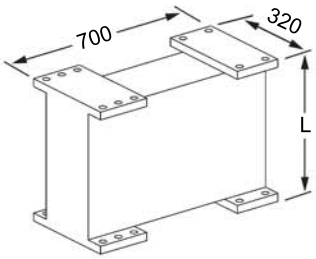
| Pinned Front Strut Outer | | |
|---|---|---|
| Code | Length L (mm) | Weight (Kg) |
| DPSF-0.31M | 310 | 42.5 |
| DPSF-0.46M | 460 | 68.5 |
| DPSF-0.61M | 610 | 86.5 |
| DPSF-0.76M | 760 | 105 |
| DPSF-0.91M | 910 | 130 |
| DPSF-1.06M | 1060 | 148 |
| DPSF-1.21M | 1210 | 166.5 |
| DPSF-1.36M | 1360 | 192 |
| DPSF-1.51M | 1510 | 212 |
| DPSF-1.66M | 1660 | 230 |
| DPSF-2.16M | 2160 | 300 |

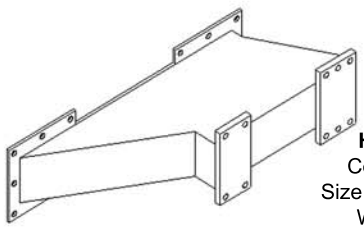



| Pinned Rear Strut Outer | | |
|---|---|---|
| Code | Length L (mm) | Weight (Kg) |
| DPSR-0.27M | 270 | 10.7 |
| DPSR-0.42M | 420 | 18.7 |
| DPSR-0.57M | 570 | 26.6 |
| DPSR-0.72M | 720 | 34.6 |
| DPSR-0.87M | 870 | 42.5 |
| DPSR-1.02M | 1020 | 50.5 |
| DPSR-1.17M | 1170 | 58.4 |
| DPSR-1.32M | 1320 | 69 |
| DPSR-1.47M | 1470 | 77 |
| DPSR-1.62M | 1620 | 85.1 |
| DPSR-2.12M | 2120 | 111.3 |



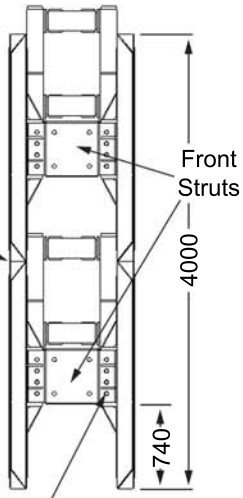

| Hogback Spacer | | |
|---|---|---|
| Code | Length L (mm) | Weight (Kg) |
| DS-HB-450EXT | 460 | 90 |
| DS-HB-950EXT | 960 | 160 |



**Hogback Post**
Code: DS-HB-VP
Size: 1250 x 450 x 320
Weight: 120 Kg

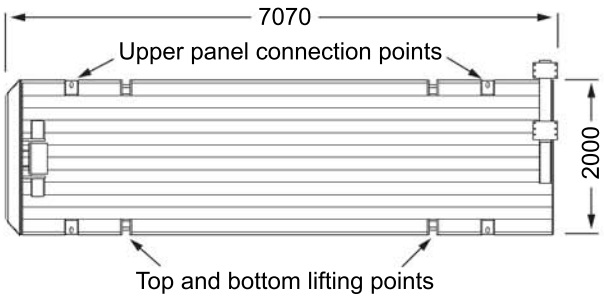
## 4. Dimensions and Connection Details



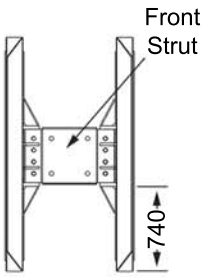

Upper to Lower panel connection:
1 off conn. strap - 2 off M30 x 110 bolts (per side).
1 off Front conn. plate - 8 off M20 x 75 bolts (per side)

Front strut inner to Panel Connection. M30 x 160 long bolts (4 per side). Front strut inner to Outer Connection DPSF-PIN (2 per side)

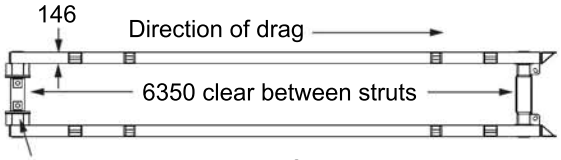
**Front End Elevation Showing Upper Box Connected**




**Side Elevation**

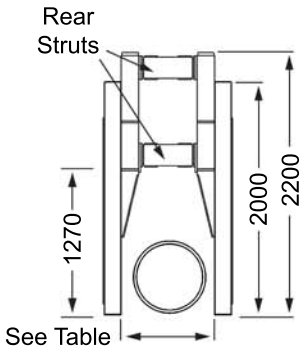



**Front End Elevation**



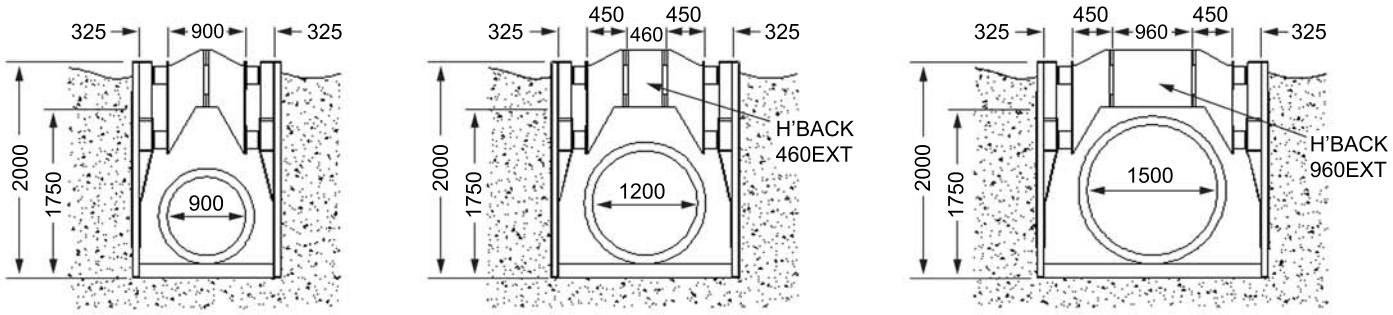

Rear strut Inner to Panel Connection
M20 x 60 Long bolts (12 per side - base panel)
Rear strut Inner to Outer Connection
DPSR-PIN (1 per side)

**Plan**

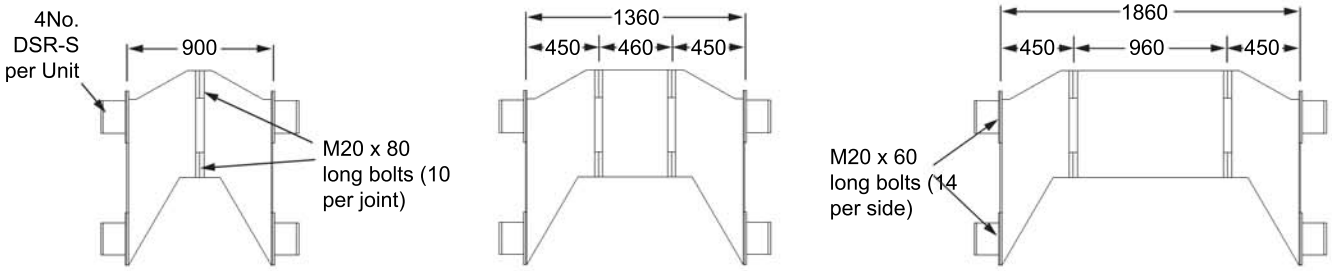



**Rear End Elevation**

### 4.1 High Clearance Base Boxes Using Hogback Struts




### 4.2 Details of Hogback Units (Used at Rear Strut Position on Base Box Only)




**Type 'A'**
(2 off DS-HB-VP, 4 off DSR-S)
Weight: 348 kg

**Type 'B'**
(2 off DS-HB-VP, 1 off DS-HB-450EXT, 4 off DSR-S)
Weight: 439 kg

**Type 'C'**
(2 off DS-HB-VP, 1 off DS-HB-950EXT, 4 off DSR-S)
Weight: 510 kg

## 5. Sizes and Quantities of Struts Required to make up particular sizes of Dragbox

**Note:** 1. Always allow sufficient clearance for excavator bucket to work comfortably within internal width of side panels when selecting a box size.
2. Non-standard equipment may be available if other widths required.

| | | Front Strut Outer | | Rear Strut Outer | | Base Box | |
|---|---|---|---|---|---|---|---|
| Internal Width (mm) | External Width (mm) | Size (mm) | No. Reqd Base | Size (mm) | No. Reqd Base | Kit Ref. No. | Weight Kg |
| 650 | 942 | 310 | 1 | 270 | 2 | DBXPS-7x1 | 4341 |
| 800 | 1092 | 460 | 1 | 420 | 2 | DBXPS-7x2 | 4383 |
| 950 | 1242 | 610 | 1 | 570 | 2 | DBXPS-7x3 | 4417 |
| 1100 | 1392 | 760 | 1 | 720 | 2 | DBXPS-7x4 | 4451 |
| 1250 | 1542 | 910 | 1 | 870 | 2 | DBXPS-7x5 | 4492 |
| 1400 | 1692 | 1060 | 1 | 1020 | 2 | DBXPS-7x6 | 4526 |
| 1550 | 1842 | 1210 | 1 | 1170 | 2 | DBXPS-7x7 | 4560 |
| 1700 | 1992 | 1360 | 1 | 1320 | 2 | DBXPS-7x8 | 4607 |
| 1850 | 2142 | 1510 | 1 | 1470 | 2 | DBXPS-7x9 | 4643 |
| 2000 | 2292 | 1660 | 1 | 1620 | 2 | DBXPS-7x10 | 4677 |
| 2500 | 2792 | 2160 | 1 | 2120 | 2 | DBXPS-7x11 | 4800 |

With Hog Back Struts (Rear Strut - Base Box Only)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1550 | 1842 | 1210 | 1 | 900 | 1-A | DBXPS-7x12 | 4686 |
| 2000 | 2292 | 1660 | 1 | 1360 | 1-B | DBXPS-7x13 | 4878 |
| 2500 | 2792 | 2160 | 1 | 1860 | 1-C | DBXPS-7x14 | 5020 |

## 6. Off Loading, Site Handling and Assembly of Standard Dragbox General Guidance Notes

### 6.1 Manpower

The Health and Safety Regulations require that personnel deployed are suitably trained, experienced and supervised by a competent person.

### 6.2 Plant for Lifting

A suitable appliance is required for off-loading and assembly if required. The machine lifting capacity and clearance under the lifting point should be checked against the sizes and weights of the dragbox to be lifted / assembled.

### 6.3 Tools and Lifting Chains (available from Mabey Hire Ltd)

6.3.1 Podgers / Spanners for making bolted connections (M20 & M30 bolts)

6.3.2 Lifting chains of suitable length and capacity complete with current certification. Typically a set of 4 leg 13mm chains with 4.0m leg length complete with shortening clutches and safety hooks. (Code JCBP-037, weight 84kg) Refer to Lifting Chain User Information for more details.

### 6.4 Access and Hard Standing Areas

These include:-

6.4.1 Suitable area to off-load the lorry and assemble the Dragbox.

6.4.2 Suitable hard standing for the machine to operate to lift the box into the trench.

6.4.3 Suitable access equipment (ladder or staging) for attaching lifting chains and connecting top extension to base box.

6.4.4 Ladders and possibly other provisions to provide safe access into and out of the trench.

### 6.5 Supply of Equipment to Site

Mabey Hire will normally supply the 7m drag boxes completely pre-assembled to the width required for immediate installation in the trench.

Clients need to allow for the **upper** box to be connected to the **lower** box on site.

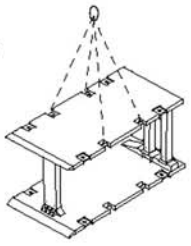
**NOTE: Clients should not normally attempt to dismantle and assemble boxes themselves on site.**

### 6.6 Return of Equipment Off-Hire

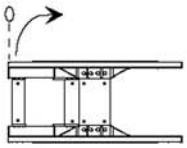
Clients should ensure that on removal, the equipment is returned in sections as supplied.

### 6.7 Slinging of 7m Dragbox (See pages 1, 2 and 3 for weights).

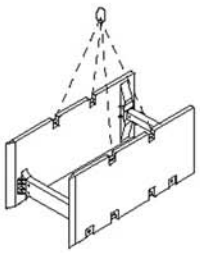
6.7.1 Off Loading/Reloading Lorry (Base and Extension Box, Pre-assembled in Depot). Use 4 leg chain sling (JCBP-037) connected to lifting points as shown.



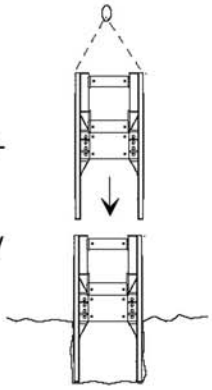
6.7.2 Standing Pre-assembled Boxes Upright
Use 2 No lifting points provided. Lift by upper panel only.



6.7.3 Lifting Pre-assembled Boxes When in Upright Position (Base and Extension)
Use the 4 No. lifting points provided



6.7.4 Connection of Upper box (When it is required to increase the support height to between 2-4m using 2 No. boxes).
Use the 4 No. lifting points. Stand lower box upright in partly dug trench. Lower upper box onto lower box and fit 2 No. front conn. plates at the front and 2 No. rear conn. straps at the rear.



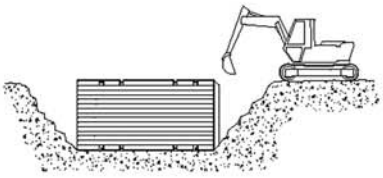
# 7. Use of Standard Dragbox

## 7.1 Preliminaries

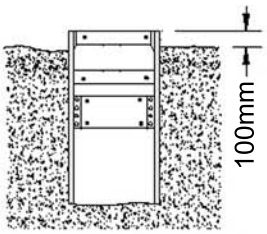
7.1.1 Check all bolts are fitted and tight before lifting box into trench.
7.1.2 Check all pins c/w 'R' clips are fitted before lifting box into trench.
7.1.3 A suitable excavator is required - as a guide the manufacturer's quoted "digging force" should be at least 5 x the weight of the dragbox equipment in use.

## 7.2 Installation

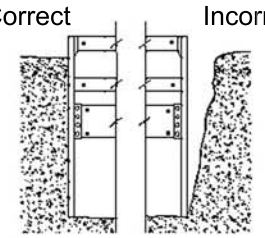
7.2.1 Excavate initial section of trench. Lift dragbox into trench using excavator or crane.
7.2.2 The Dragbox must NOT be pushed down into the trench using a 'dig and drive' method.
7.2.3 Always maintain a safe batter of the unsupported parts of the trench in front of and behind the box.
7.2.4 Fill any voids on outside of panels so that the box cannot be pushed sideways by any soil movement. Ensure the box is installed vertically.
7.2.5 Allow for at least 100mm of projection of top of box above ground level - to prevent debris rolling into excavation.
7.2.6 DO NOT leave the base of the box 'flying' above the excavation level.



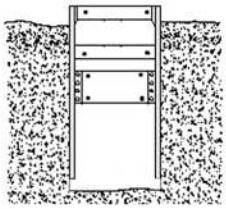
Always maintain a safe batter of the unsupported parts of the trench, in front of and behind the box.




When the required excavation level is reached and the box sunk to the required depth, ensure that the box is vertical.




Ensure that there are no voids between the box panel and the trench sides as this may cause the box to move sideways.



DO NOT leave the base of the box 'flying' above the excavation level.

## 7.3 Entering the Supported Excavation

7.3.1 Use a ladder to enter the working space between the struts of the Dragbox. Do not climb up or down the struts.
7.3.2 Do not use any unsupported part of the trench for access.
7.3.3 Do not move the box when personnel are inside.
7.3.4 Wear a safety helmet to minimise risk of head injury.
7.3.5 Ensure that the excavator operator is aware of your intentions.

## 7.4 Operation

7.4.1 Before entering the working space within the Dragbox :-
a) Prepare the pipe bedding material.
b) Lift a section of pipe into the trench.
7.4.2 Enter the working space and complete installation of the pipe section by joining onto previously laid sections. Restrain the pipe section to prevent displacement whilst dragging the Dragbox along the trench.
7.4.3 Exit from the working space.
7.4.4 Drag the box forward by hooking the bucket round the front strut of the box. Use the hydraulics of the excavator for this rather then moving the machine on its wheels / tracks.
7.4.5 Backfill the trench behind the Dragbox.

## 7.5 Extraction

7.5.1 Lift the Dragbox from the trench with excavator or suitable craneage, using 4 leg chain (JCBP-037) connected to lifting points.

## 7.6 Site Storage (Stability Considerations)

7.6.1 Dragboxes should be stored laid on their side when not in use. Uneven or sloping ground and/or wind loading can result in inadequate stability if left standing upright.

7.7 Trench Reinstatement

7.7.1 Users should note that some settlement of the reinstated ground and ground adjacent to the Dragbox is likely to occur after backfilling.

7.8 Maintenance

7.8.1 Keep all nuts and bolts tight.
7.8.2 Damaged struts must not be used.
7.8.3 We regret that we are unable to provide staff to change boxes from one size to another on site.

IF IN DOUBT CONSULT MABEY HIRE LTD.

## 8. Summary - DO'S AND DONT'S

DO - Ensure that all operatives are familiar with the safety and operating instructions.
DO - Take care not to overstress the boxes (watch for bowing of the panels).
DO - Check that all nuts and bolts are tight but not over tightened.
DO - Check all pins and 'R' clips are fitted.
DO - Follow the basic maintenance instructions.
DO - Use a ladder to enter the box.
DO - Wear a safety helmet.
DO - Use suitable 4 leg slings and lifting equipment.
DO - Provide a landing below the top of the box. This will prevent debris rolling down onto personnel inside the box.
DO - Always maintain a safe batter of the unsupported parts of the trench in front of and behind the Dragbox.
DO - Store boxes on their side.

DON'T - Move the box with personnel inside.
DON'T - Hammer the box with the bucket.
DON'T - Use lifting lugs for other than loading/unloading or assembly purposes.
DON'T - Use damaged struts.
DON'T - Use spacer combinations other than those recommended by Mabey Hire Ltd.
DON'T - Use unsafe lifting equipment.
DON'T - Enter unsupported parts of the excavation.
DON'T - Sit astride the box struts.

ALWAYS - Consult a qualified person if there is any doubt about ground pressures.

## 9. References

CIRIA Report 97:Trenching Practice

## 10. GENERAL

Since our policy is one of continual improvement, components may vary in detail from the descriptions given in this publication.